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Explanation of Significant Differences to Groundwater Record of Decision

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For more information about Brookhaven Lab, go to www.bnl.gov on the World Wide Web.

For more information on groundwater cleanup, contact:

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In June 2000, the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the New York State Department of Environmental Conservation (NYSDEC) agreed to a series of cleanup activities to remove contamination in groundwater at and near Brookhaven National Laboratory (BNL). These decisions were described in a "Record of Decision", or ROD; the cleanup area is defined as "Operable Unit III" or OU III.

BNL project manager inspects part of a newly installed strontium-90 treatment system.

Most of those cleanup activities are well underway, and the groundwater is being cleaned. Three cleanup decisions, however, required additional action to be final. The document that describes the remaining cleanups – for the Magothy Aquifer, the two strontium-90 plumes, and the Building 96 "anomalies" – is called an Explanation of Significant Differences (ESD).

In brief, the ROD held open the option of a remedy to clean up the Magothy Aquifer – which is about 200 feet below ground and several hundred feet thick – on and off the Laboratory property until additional characterization was done and groundwater wells were installed. The final strontium-90 decision is being modified, based on a pilot study done to evaluate the effectiveness of the proposed cleanup technology. Finally, the Building 96 "anomalies" have been removed.

This fact sheet summarizes the information in the ESD. The DOE, EPA, and NYSDEC agree that these changes do not fundamentally alter the remedy selected in the ROD. These remedies remain protective of human health and the environment, and comply with Federal and State requirements that were identified in the ROD.

A full copy of the ESD may be found in the libraries listed on the back of this fact sheet, or online at http://www.bnl.gov/erd/groundwater.html

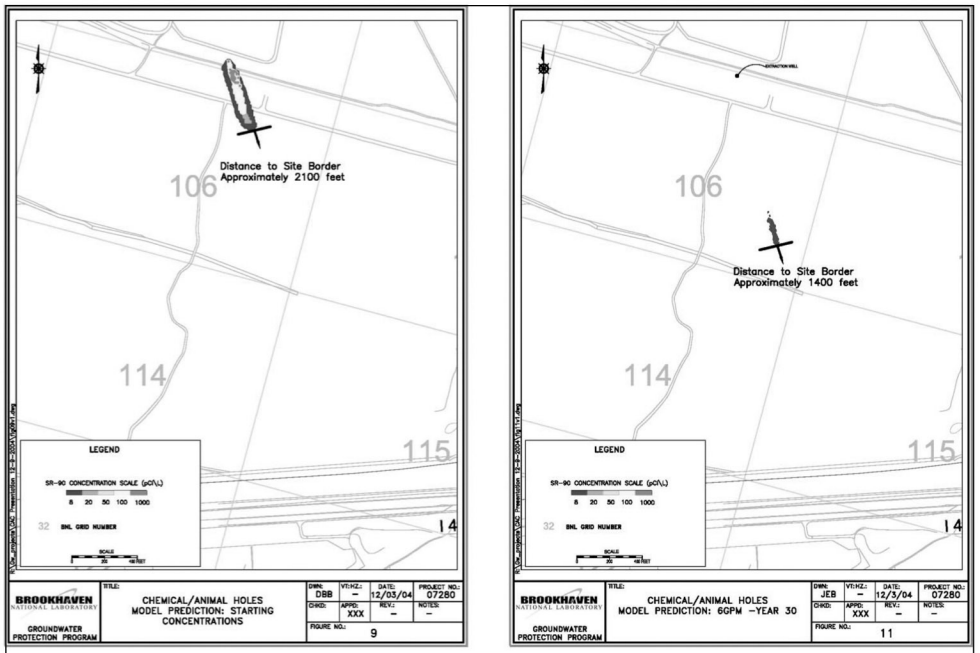
If you wish to learn more about the groundwater cleanup, please join us at an information session:

January 11, 2005 7-9 p.m.
Brookhaven National Laboratory
Berkner Hall

Please note that all visitors to Brookhaven Laboratory age 16 and older must present photo identification for admission to BNL.

Magothy Aquifer

The ROD called for additional characterization and installation of groundwater monitoring wells in the Magothy Aquifer. The ROD also stated that, when the characterization and monitoring were complete, the need for a Magothy remedy would be evaluated by the DOE, EPA, and NYSDEC. After evaluating the additional characterization results, the DOE, EPA, NYSDEC, and Suffolk County Department of Health Services (SCDHS) agree that a



The map on the left shows the original location and size of the strontium-90 plume near the Chemical Holes. The map on the right shows the projected size and location of the plume after 30 years. At 40 years, the entire plume will be below drinking-water standards.

remedy to remove volatile organic compounds (VOCs) from the Magothy Aquifer is appropriate.

Most homes in the area have public water hook-ups; there are no Suffolk County Water Authority drinking-water wells in the area. There are seven known homeowners who are not connected to public water. Each year DOE offers them free testing of their private drinking-water wells. The SCDHS is copied on the annual letters and will continue to be kept informed.

The remedy for the Magothy Aquifer calls for:

- Continued operation of the existing extraction wells (part of the Upper Glacial Aquifer treatment systems) that capture Magothy VOC contamination
- Operation of extraction wells for approximately ten years; continue monitoring for about 55 years to meet drinking-water standards
- Installation (completed during the summer of 2004) of two additional off-site Magothy extraction wells: one on Stratler Drive (south of Carlton Drive) and one at the Industrial Park East location to capture high concentrations of VOCs and prevent migration through holes in a brown clay layer and into the Magothy Aquifer.
- Continue to monitor and evaluate the data to ensure protectiveness
- Maintain institutional controls and five-year reviews.

Strontium-90

Original characterization identified two strontium-90 plumes associated with OU III on the BNL site. The smaller plume is downgradient of the former "Chemical Holes" disposal site. Historical leakage from the long-closed Brookhaven Graphite Research Reactor and the Waste Concentrating Facility resulted in a strontium-90 plume located in the middle of the BNL site. The highest concentrations were originally found in the Chemical Hole plume. Strontium-90 groundwater contamination has not been detected in areas off of the BNL site. It should be noted that no drinking-water wells are near these plumes.

The ROD called for conducting a pilot study to evaluate the effectiveness of the extraction and treatment remedy for cleanup up strontium-90. Because the Chemical Hole plume showed higher concentrations of contamination and was closer to the Lab's boundary, it was chosen to test the treatment system. The pilot study involved installing an extraction well, using ion exchange to remove strontium-90 from the extracted groundwater, and on-site discharge of the clean water. The ROD stated that, once the pilot study was complete, the final remedy may be modified.

The pilot study has been completed. The study demonstrated that strontium-90 can be removed from the groundwater. However, the study also showed that when water flows through the filters quickly, the filters capture and hold minerals and other natural impurities in addition to the strontium-90. This resulted in a disproportionately high rate of filters used in relation to relatively small quantities of strontium-90 actually removed from the groundwater. Because the filters need to be changed much more frequently than anticipated, the cost of the originally proposed rate of treatment is much greater than originally assumed in the ROD.

Slowing down the rate at which groundwater is treated will extend the life of the filters by minimizing the capture of natural impurities. This allows the system to operate more efficiently, generates less waste, and reduces overall operational costs. Strontium-90 is removed as effectively at low flow rates as at high flow rates. Because strontium-90 moves slowly in groundwater, computer modeling shows that, even at the lower flow rates, the strontium-90 contamination will stay entirely on Laboratory property, well away from any drinking-water wells. It will, however, take longer to reach drinking-water standards. Periodic regulator reviews of treatment progress will ensure the effectiveness of this protective measure.

The remedy for strontium-90 calls for:

- Maintaining the same cleanup goal – to meet the EPA's maximum contaminant level and minimize plume growth – for the strontium-90 groundwater contamination
- Continuing active treatment, but at a more efficient flow rate
- Allowing additional time – that is, up to 70 years instead of 30 years – for some of the work to be completed
- Limiting the footprint of contamination

The three maps above show, from left to right, the current size and location of the BGRR/WCF strontium-90 plume, the projected size and location at 30 years, and the projected size and location at 50 years. At 70 years, the entire plume will be below drinking-water standards.

- Ensuring that the contamination will not cross the site boundary
- Continued monitoring to verify that the cleanup is working as expected
- Maintaining institutional controls and five-year reviews

Building 96 Anomalies

Decades ago, the area south of Building 96 was used as a scrap yard and for 55-gallon drum storage. Because this area was a potential source of VOC contamination, surveys – using instruments similar to a metal detector – were performed during 1999. Several anomalies were identified, indicating the potential presence of foreign or man-made objects buried in this area. Based on these results, exploratory excavation to investigate the anomalies was recommended, and if contamination was found, the area should be cleaned up.

Twenty-one exploratory excavations were performed in March 2004. The work crew found pieces of concrete, scrap metal, and iron-stained soils. No contamination was detected. One out-of-service cesspool was found that contained debris, a tire, and pieces of concrete. Sampling indicated it was suitable for backfilling. SCDHS reviewed the results, the debris was removed, and the cesspool was backfilled in September 2004. In summary, the anomalies turned out to be scrap material, and no further action is necessary.

The remedy for the Building 96 anomalies calls for:

- No further action.

Public Participation Activities

While a public comment period is not required when issuing an ESD, DOE is interested in receiving public input on these changes. DOE will accept comments on the OU III ESD from December 15, 2004 through January 21, 2005.

To submit comments, you may send an email to tellDOE@bnl.gov, fax to (631) 344-3444, or write to:

Mr. Michael Holland
attn: ESD
Site Manager, Brookhaven Site Office
U.S. Department of Energy
PO Box 5000
Upton, NY 11973

Additionally, there will be a public information session about these changes on January 11, 2005, from 7-9 p.m. at Brookhaven National Laboratory's Berkner Hall, Room B. Interested members of the public are invited to learn more about the ROD changes and cleanup projects.

The ESD is available on the web at http://www.bnl.gov.erd/groundwater.html. The ESD and other relevant documents are part of the Administrative Record file for the BNL site. The Administrative Record includes the ROD and technical documents. These documents are available for review at the following libraries:

Mastics-Moriches-Shirley Community Library
301 William Floyd Parkway
Shirley, New York 11967

BNL Research Library
Building 477A
Brookhaven Avenue
Upton, New York 11973

U.S. EPA - Region II
Administrative Record Room
290 Broadway, 18th Floor
New York, New York 10007

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To submit your comments before the end of the comment period, please do one of the following:

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attn: ESD
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P.O. Box 5000
Upton NY 11973

WHERE TO FIND THE PROPOSED PLAN

The Explanation of Significant Differences (ESD) for Groundwater Cleanup Record of Decision and the supporting documents are available at http://www.bnl.gov/erd/groundwater.html on the World Wide Web, and at the following libraries:

- BNL Research Library
  Building 477
  Brookhaven National Laboratory
  Upton NY 11973
  (631) 344-3483

- Mastics-Moriches-Shirley Community Library
  301 William Floyd Parkway
  Shirley NY 11967
  (631) 399-1511

- U.S. EPA Region II Library
  290 Broadway
  New York NY 10007
  (212) 637-4308